

**NORTH CAROLINA DIVISION OF
AIR QUALITY**

Application Review

Issue Date: TBD

Region: Mooresville Regional Office
County: Gaston
NC Facility ID: 3600039
Inspector's Name: Joseph Foutz
Date of Last Inspection: 06/08/2016
Compliance Code: 3 / Compliance - inspection

Facility Data Applicant (Facility's Name): Duke Energy Carolinas, LLC - Allen Steam Station Facility Address: Duke Energy Carolinas, LLC - Allen Steam Station 253 Plant Allen Road Belmont, NC 28012 SIC: 4911 / Electric Services NAICS: 221112 / Fossil Fuel Electric Power Generation Facility Classification: Before: Title V After: Title V Fee Classification: Before: Title V After: Title V				Permit Applicability (this application only) SIP: 02Q .0317 NSPS: n/a NESHAP: n/a PSD: n/a PSD Avoidance: limit removed NC Toxics: n/a 112(r): n/a Other: Removed PSD avoidance limit			
Contact Data				Application Data			
Facility Contact M. Randy Gantt Lead EHS Professional (704) 829-2587 253 Plant Allen Road Belmont, NC 28012		Authorized Contact P. Brent Dueitt General Manager II (704) 829-2400 253 Plant Allen Road Belmont, NC 28012		Technical Contact Ann Quillian Sr. Env. Specialist (919) 546-6610 PO Box 1551 Raleigh, NC 27602		Application Number: 3600039.17B Date Received: 06/20/2017 Application Type: Modification Application Schedule: TV-Significant Existing Permit Data Existing Permit Number: 03757/T41 Existing Permit Issue Date: 03/27/2017 Existing Permit Expiration Date: 12/31/2019	
Total Actual emissions in TONS/YEAR:							
CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2015	1127.94	2682.31	21.27	353.68	178.19	20.96	17.92 [Hydrogen chloride (hydrochlori]
2014	1718.20	4018.53	29.88	984.77	291.49	28.98	24.87 [Hydrogen chloride (hydrochlori]
2013	846.27	3155.95	25.31	884.92	322.22	29.05	23.95 [Hydrogen chloride (hydrochlori]
2012	707.34	2296.93	25.18	864.71	242.38	33.19	27.49 [Hydrogen chloride (hydrochlori]
2011	1665.32	4401.64	53.38	1804.34	534.51	71.32	59.09 [Hydrogen chloride (hydrochlori]
Review Engineer: Russell Braswell Review Engineer's Signature: Date:				Comments / Recommendations: Issue 03757/T42 Permit Issue Date: TBD Permit Expiration Date: TBD			

1. Purpose of Application:

The Duke Energy Progress, LLC – Allen Steam Station (Duke) is a coal-fired electric generating utility and currently operates under Title V Air Quality Permit 03757T41. This permit allows Duke to use a "halide salt" additive in its coal. Duke has submitted this application to remove all references to halide salts, and no longer plans to use these additives.

2. Discussion:

Duke initially submitted the request to remove halide salt from the permit as a "502(b)(10)" modification. However, because this action would remove an emission limit from the permit, this is being processed as a one-step significant modification.

The application explains that Duke initially planned to use halide salt additives in order to comply with mercury emission limits under 40 CFR Part 63, Subpart UUUUU (aka MATS or the EGU MACT). Duke requested to add halide salts to the permit in application .15D, and this was incorporated into the T41 permit.

Since initially applying to use halide salts, Duke has discovered that this additive is not necessary for compliance with Subpart UUUUU. Therefore, Duke no longer plans to use these additives and wants all references thereto removed from the permit:

The existing permit contains a PSD avoidance limit regarding PM_{2.5} emissions related to the use of the halide salt additives. Now that halide salts have been removed from the facility, this limit will be removed from the permit. A footnote will be added to the permitted emission source list that disallows the use of halide containing materials for mercury control.

Based on the T41 permit review (Ed Martin, March 27, 2017), potential post-control emissions of PM_{2.5} from the use of halide salts was calculated as 9.26 ton/yr (2.11 lb/hr). Because this is being removed from the permit, PSD Increment Tracking will be updated to reflect this reduction in PM_{2.5} emissions. Attachment 1 to this review contains the sections of the T41 permit review that are relevant to the use of halide salts.

For a complete list of changes, see Attachment 2 to this review.

3. Application Chronology:

- June 13, 2017 Application received.
- July 7, 2017 In an email to Ed Martin, Duke confirmed that the other additives (e.g. "alkaline-based fuel additive") used at this facility do not contain halogens.
- July 17, 2017 An initial draft of the permit and review were sent to DAQ staff (Tom Anderson, Mark Cuilla, Samir Parekh, Joe Foutz, Denise Hayes) and Duke staff (Ann Quillian). For a summary of comments received, see Attachment 2.
- XXXXX Public / EPA notice
- XXXXX Permit issued.

4. Recommendations

Issue permit 03757T42.

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Excerpts from T41 Permit Review

(Ed Martin; March 27, 2017)

I. Purpose of Applications:

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Application 3600039.15D (consolidated into application 3600039.15A)

This application is requesting the use of mercury oxidation fuel additives (halide salt or equivalent additives) applied to the incoming coal to reduce mercury emissions in order to comply with the MATS rule emission limits.

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V. Summary of Changes to Emission Sources and Control Devices

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- B. Added halide salt mercury oxidation fuel additives to Units 1-5 (ES-1 through ES-5) source description in the Section 1 table of permitted emission sources and in the Section 2.1.A equipment description.

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VI. Emission and Regulatory Evaluation

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C. Halide Salt Mercury Oxidation Fuel Additives

Duke is requesting to use mercury oxidation fuel additives (halide salt or equivalent additives) applied to the incoming coal to reduce mercury emissions in order to comply with the MATS rule emission limits. Mercury can be found in two forms along the flue gas path: elemental mercury (Hg^0) and oxidized mercury (Hg^{2+}). The oxidized form of mercury is most easily controlled by the existing control devices; therefore, it is desired to convert as much as elemental mercury to the oxidized form and ensure that the material does not revert back to the elemental state to allow for better control device removal efficiencies. Control devices along the flue gas path can alter the oxidation state of mercury and affect the resulting control efficiencies. The selective catalytic reduction (SCR) catalyst contributes to oxidizing mercury from the elemental form to a soluble ionic form, which can readily be captured in the downstream flue gas desulfurization (FGD) scrubber. Duke has determined that oxidation fuel additives may be needed on a periodic basis to ensure that the mercury is adequately oxidized in the combustion process and captured in the downstream scrubber. Duke states that the MATS mercury emission limits can be met using the current control technologies; however, the oxidation additives will be an “insurance policy” to help ensure compliance with the MATS mercury limits. The additives would be used on an as-needed basis not to exceed 15 gallons per hour for each unit. Duke requested in the application (3600039.15D) that a footnote be added to the Section 1 table of permitted emission sources for the boilers to include a statement that, along with the gallons per hour application rate, the halide salt mercury oxidation fuel additives shall not contain any toxic air pollutants listed in 15A NCAC 02Q .0711. However, it was decided that, as a result of internal comments on the Marshall PM CEMS/MATS/halide salt and renewal permits (being concurrently reviewed along with drafting

the same changes for the Allen permit), rather than using a footnote, it would be more proper to incorporate the application rate into the source description for each unit. Since this review documents that Duke has stated in the application that the mercury oxidation additives will not contain any toxic air pollutants, it is not necessary to include the same in the permit.

PM/PM-10/PM-2.5 Emissions and PSD Applicability

For conservatism, PM/PM-10/PM-2.5 emissions are based on assuming the “halide salt” solution is 100% particulate matter, that the highest density product is used, and that it has not reacted in the combustion process. Emissions are reduced by the collection efficiency of the electrostatic precipitator and flue gas desulfurization scrubber. Emissions are calculated as follows:

Application rate	15 gallons/hr
Density	14.1 lb/gallon
Combined collection efficiency (ESP and scrubber)	99.8%
Operation time	8760 hr/yr
Number of units at facility	5

PM/PM-10/PM-2.5 emissions:

$$\frac{\text{tons}}{\text{yr}} = \left(\frac{15 \text{ gallons}}{\text{hr}} \right) \left(\frac{14.1 \text{ lb}}{\text{gallon}} \right) \left(\frac{8760 \text{ hr}}{\text{yr}} \right) \left(\frac{\text{ton}}{2000 \text{ lb}} \right) (1 - 0.998)(5 \text{ units}) = 9.26 \text{ tpy}$$

The above potential PM/PM-10/PM-2.5 emissions are below the PSD significant threshold emission rates of 25 tpy/15 tpy/10 tpy respectively and therefore PSD review is not triggered.

The revised permit will include a PSD avoidance stipulation to limit PM-2.5 emissions to less than 10 tons per consecutive 12-month period assuming all halide salts introduced in the combustion process are released into the atmosphere. All particulate emissions are assumed to be in the form of PM-2.5 and the avoidance limit will be based upon 10 tons per consecutive 12-month period. The condition (2.1.A.16) includes requirements for monthly emission calculations for PM-25 when applying halide salts with the incoming coal, and associated recordkeeping ((logbook (written or electronic)) and reporting (semi-annual basis).

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VIII. Other Requirements

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Increment Tracking

Gaston County has triggered increment tracking under PSD for PM-10, SO₂ and NO_x. This permit modification will result in an increase in 2.11 pounds per hour of PM-10. This permit modification does not consume or expand increments for SO₂ or NO_x.

From Section VI.C above, emissions of PM-10 are 9.26 tpy for all five units. Therefore, the hourly PM-10 emission rate is:

$$\left(\frac{9.26 \text{ tons}}{\text{year}} \right) \left(\frac{\text{year}}{8760 \text{ hour}} \right) \left(\frac{2000 \text{ lb}}{\text{ton}} \right) = 2.11 \text{ lb/hour}$$

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X. Comments Received During Public Notice

Comments on the draft permit were received from the Southern Environmental Law Center (SELC) on behalf of itself, the Catawba Riverkeeper, Clean Air Carolina, and Medical Advocates for Healthy Air and the Sierra Club as follows:

SELC Comments

Comments were received from the SELC on February 27, 2017, as follows, with DAQ's response:

1. Duke Energy's proposal to reduce Allen's mercury and air toxic emissions would only exacerbate another serious problem stemming from the Allen coal plant operations: contamination of downstream drinking water supplies with cancer-causing pollutants. To control mercury and air toxic emissions from Allen, DEQ proposes to allow Duke Energy to use a 'halide salt' fuel additive. These halides would then become part of the waste that is discharged into Duke Energy's coal ash basins at Allen. Many drinking water intakes are located downstream of the discharges from the Allen coal ash basins. Unfortunately, halides— particularly a type of halide called bromide—are known to cause carcinogens to form when they enter downstream drinking water intakes. These carcinogens are called trihalomethanes, and form when bromides mix with chlorine in drinking water supplies. In other words, bromides that are introduced into Duke Energy's coal-burning process to control air pollution may instead end up contributing to cancerous substances in the drinking water that hundreds of thousands of people rely on.

There are no limits for halides or bromides in Duke Energy's wastewater permit for Allen that would protect downstream communities from these dangerous substances.

Rather than allowing Duke Energy to add cancer-causing substances to its coal operations, NCDEQ should require Duke Energy to install technologies that are proven to reduce toxic air emissions without carcinogenic side effects. Fabric filters, also known as baghouses, are widely used throughout the coal power plant industry to capture toxic particles before they escape into the air that people breathe.

NCDEQ must also require Duke Energy to excavate its bromide-contaminated coal ash in order to stop the ongoing discharge of bromides from the coal ash basin at Allen that continue to contribute to cancer-causing substances in downstream drinking water intakes.

DAQ's Response

The addition of the use of halide salts to control mercury in the Allen permit at the rates specified does not violate any state or federal regulations. Regarding bromide ending up in the drinking water, SELC comments that NCDEQ should require Duke Energy to install technologies that are proven to reduce toxic air emissions. However, bromide is not a toxic air pollutant listed in 15A NCAC 02Q .0711 for which NCDEQ regulates. Duke Allen's current National Pollutant Discharge Elimination System (NPDES) permit, under the Clean Water Act, requires outfall monitoring of chloride. The draft permit under development will include outfall and instream monitoring of bromide.

The concern whether bromide is limited in the wastewater permit, and excavation of the coal ash basin at Allen, is beyond the scope of the Air Quality regulations. A copy of the SELC comments has been sent to the Division of Water resources.

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XII. Recommendations

Issuance is recommended.

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Change List

Insert list from final permit

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Comments Received on Initial Draft

- Mark Cuilla, by email on July 18, 2017

1. Mark pointed out typos in the draft permit and review.

Response: Fixed.

2. Mark suggested that the halide salt discussion in the T41 review be attached to this review.

Response: Done.

- Ed Martin, by email on July 20, 2017

Ed provided language disallowing the use of halogen materials for mercury control. This is to be added to each Duke facility that was previously permitted for halide salts.

Response: Added.

- Ann Quillian, by email on July 20, 2017

1. The PSD Increment Tracking statement mentions that PM10 emissions have been reduced, but this application focused on PM2.5. Is this a typo?

Response: No. PSD Increment Tracking only follows PM10. The initial halide salt application assumed that all PM emitted would be PM2.5, and that PM2.5 = PM10. I see no reason to revisit this assumption.

2. Please remove the following sources from the Insignificant Activates List: I-12; I-56, I-59, I-60, I-76, and I-77

Response: Done.

3. Please change the facility's mailing address to match the facility's physical address.

Response: Done.

4. Please change the facility's technical contact to be Ann Quillian.

Response: Done.